CLAIMS

1. In an Internet Protocol telephony system having at least two gateway devices integrated with Internet Protocol version 6 (IPv6), a voice over Internet Protocol (VoIP) communications method for optimizing latency delays in data packet transmissions between said gateway devices and over the related "public" Internet comprising the steps of:

a. identifying and conducting a trace of available VoIP routes between two user destinations, each associated with a separate gateway device and the related "public" Internet, and measuring the latency associated with all said available VoIP routes, said VoIP route identification and tracing process being conducted through a Latency header within the NEXT header extension of IPv6, which Latency header is a modification of the Source Routing header within the NEXT header extension of IPv6;

b. creating a subset of best available VoIP routes, based upon application of latency criteria, and, also using said latency criteria, identifying the best available VoIP route at the time of said trace measurement;

c. identifying and selecting an optimum VoIP route based upon consideration of both said best available VoIP route and historical information concerning the best available route between said two user destinations at past times;

d. conducting steps a, b and c at periodic intervals; and

e. periodically updating historical information concerning best available routes between said two user destinations.

2. The VoIP communications method of Claim 1, wherein steps a, b and c are conducted in correlation with a dynamic data library, which stores the VoIP route information created through steps a, b, c. and d and is associated with each said gateway device, said dynamic data library comprising:

a. a routing database which stores the information created by steps a, b and c, including said subset of best available VoIP routes; and

b. a destination database which contains said historical information concerning best available VoIP routes between various user destinations.

3. The VoIP communications method of Claim 2, wherein said routing database functions in correlation with and guides a hop-by-hop options generator within the Hop-to-Hop Options header of the NEXT header extension within IPv6.

4. The VoIP communications method of Claim 2, wherein said dynamic data library and routing database further comprises a switch function which disengages and guides said hop-by-hop options generator from switching to each said best available VoIP route resulting from each said trace measurement until a new said optimum VoIP route is selected.

5. The VoIP communications method of Claim 1, wherein step a further comprises the creation of gross latency database containing all said available VoIP routes between said two user destinations and the latency associated with each said route.

6. The VoIP communications method of Claim 1, wherein step b is performed in correlation with a criterion block which establishes said latency criteria and establishes the number of routes included in said subset of best available VoIP routes.

7. The Vol communications method of Claim 6, wherein step b further comprises the use of a quality of routes analyzer which, in conjunction with said criterion block, applies said latency criteria and assists in the creation of said subset of best available VoIP routes and in the identification of the best available VoIP route at the time of each said trace measurement.

8. The VoIP communications method of Claim 2, wherein step c is performed in correlation with an optimizations block which compares said best available VoIP route identified for each said trace measurement with said historical information in said destination database concerning the best available VoIP routes between the same said two user destinations at same time, within a day, week and year, as each said trace measurement.

9. The VoIP communications method of Claim 8, wherein said optimization block selects an optimum VoIP route which normalizes and reduces latency delays in an optimum

range over the span of all said trace measurements conducted in connection with a data packet transmission.

10. The VoIP communications method of Claim 6, wherein said criterion block further establishes said periodic intervals of trace measurements conducted in step d.

11. The VoIP communications method of Claim 6, wherein said criterion block further establishes the periodic intervals at which said historical database is updated in step e.

12. The VoIP communications method of Claim 2, wherein step e further comprises the deletion of the VoIP routes information created and contained in said routing database at periodic times.

13. The VoIP communications method of Claim 12, wherein said periodic deletion of routing database information occurs at the same time as said update of said destination database.

14. The VoIP communications method of Claim 1, wherein said communications method has application to multimedia transmissions overthe "public" Internet.

15. A method of improving and optimizing latency delays associated with VoIP communications and related data packet transmissions between two user destinations and the associated "public" internet, which method comprises modifying the Source Routing header of the NEXT header extension within IPv6 to create a new Latency header,and, in conjunction with the Hop-to-Hop Options header of the NEXT header within IPv6, further comprises the steps of:

a. identifying and conducting, through said Latency header, a trace of available VoIP routes between said two user destinations and measuring the latency associated with all said available VoIP routes;

b. creating a subset of best available VoIP routes, based upon application of latency criteria, and, also using said latency criteria, identifying the best available VoIP route at the time of said trace measurement;

c. identifying and selecting an optimum VoIP route based upon consideration of both said best available VoIP route and historical information concerning the best available route between said two user destinations at past times;

d. conducting steps a, b and c at periodic intervals; and

e. periodically updating historical information concerning best available routes between said two user destinations.

16. The VoIP communications method of Claim 15 wherein steps a, b,c and d are conducted in correlation with a dynamic data library, which stores the VoIP route information created through said steps, and comprises:

a. a routing database which stores the VoIP route information created by steps a, b and c and including said subset of best available VoIP routes; and

b. a destination database which contains said historical information concerning best available VoIP routes between various user destinations.

17. The VoIP communication method of Claim 16 wherein said optimum VoIP route selection occurs in connection with said routing database which functions in correlation with or guides a hop-by-hop option generation within said Hop-by-Hop Options header.

18. The VoIP communications method of Claim 17, wherein said dynamic data library and said routing database further comprise a switch function which disengage and guide said hop-by-hop options generator from switching to each said best available VoIP route resulting from each said trace measurement until a new said optimum VoIP route is selected.

19. The VoIP communications method of Claim 15, wherein step a further comprises the creation of gross latency database containing all said available VoIP routes between said two user destinations and the latency associated with each said route.

20. The VoIP communications method of Claim 15, wherein step b is performed in correlation with a criterion block which establishes said latency criteria and establishes the number of routes included in said subset of best available VoIP routes.

21. The VoIP communications method of Claim 20, wherein step b further comprises

the use of a quality of routes analyzer which, in conjunction with said criterion block, applies said latency criteria and assists in the creation of said subset of best available VoIP routes and in the identification of the best available VoIP route at the time of each said trace measurement.

22. The VoIP communications method of Claim 15, wherein step c is performed in correlation with an optimizations block which compares said best available VoIP route identified for each said trace measurement with said historical information in said destination database concerning the best available VoIP routes between the same said two user destinations at same time, within a day, week and year, as each said trace measurement.

23. The VoIP communications method of Claim 22, wherein said optimization block selects an optimum VoIP route which normalizes and reduces latency delays in an optimum range over the span of all said trace measurements conducted in connection with a data packet transmission.

24. The VoIP communications method of Claim 20, wherein said criterion block further establishes said periodic intervals of trace measurements conducted in step d.

25. The VoIP communications method of Claim 20, wherein said criterion block further establishes the periodic intervals at which said historical database is updated in step e.

26. The VoIP communications method of Claim 15, wherein step e further comprises the deletion of the VoIP routes information created and contained in said routing database at periodic times.

27. The VoIP communications method of Claim 26, wherein said periodic deletion of routing database information occurs at the same time as said update of said destination database.

28. The VoIP communications method of Claim 15, wherein said communications method has application to multimedia transmissions over the "public" Internet.